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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

October 1, 1992

Ms. Donna R. Searcy
Secretary
Federal Communications Commission
Room 222
1919 M Street, N.W.
Washington, D.C. 20554

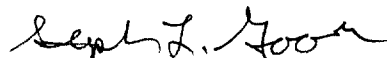
Re: RM-8004, ET Docket No. 92-9, RM 7981

Dear Ms Searcy:

Enclosed are five copies of the reply comments of Northern Telecom Inc. submitted to the Commission on August 5, 1992, concerning the petition for rulemaking filed by Alcatel Network Systems, Inc. ("Alcatel").^{1/} Because the Alcatel petition was associated with the Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies proceeding (ET Docket No. 92-9), which was within the "Sunshine" period when Northern Telecom's reply comments were submitted, the Northern Telecom filing was not made part of the record. Northern Telecom therefore is resubmitting the filing so that commenters and the Commission will have in the record an alternative channelization plan that can accommodate the needs of "migrated" licensees, without jeopardizing the operation and expansion capabilities of high capacity spectral efficient microwave systems operating in the bands to which the 2 GHz licensees would move. Copies of Northern Telecom's filing were previously submitted to the parties of record in this proceeding.

Any questions concerning this filing should be directed to the undersigned.

Sincerely,



Stephen L. Goodman
Counsel for Northern Telecom Inc.

^{1/} The Alcatel petition was placed on Public Notice for comment on June 2, 1992, DA 92-705.

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

AUG 5 - 1992

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

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FILE

In the Matter of

Petition for Rulemaking of
Alcatel Network Systems, Inc.
for Amendment of Parts 2, 21, 25
and 94 of the Commission's Rules

RM-8004

REPLY COMMENTS

Northern Telecom Inc. ("Northern Telecom") hereby responds to certain issues raised in the comments addressing the petition for rulemaking filed by Alcatel Network Systems, Inc. ("Alcatel").^{1/} As a general matter, Northern Telecom views the issues raised by Alcatel's petition as an appropriate complement to the Commission's efforts to allocate spectrum for new and innovative services such as personal communications services ("PCS"), although it is not clear that a separate rulemaking is necessary to resolve these questions since they can be addressed in the Commission's Emerging Technologies proceeding. Northern Telecom agrees with Alcatel that the Commission should develop an orderly method for migrating the current 2 GHz users into other

^{1/} The Alcatel petition was placed on Public Notice for comment on June 2, 1992, DA 92-705. Northern Telecom requests permission to file these comments late. In light of the importance of the issues raised by the petition and the concomitant need for a full and accurate record, as well as the lack of prejudice to any party, good cause exists for acceptance of these reply comments.

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bands so as to free up spectrum, rather than simply relying on a blanket waiver of the eligibility requirements. As demonstrated by several commenters, however, the specific Alcatel proposal must be modified so as not to impact adversely the operation and expansion capabilities of high capacity spectral efficient microwave systems operating in the bands to which the 2 GHz licensees would move.

Northern Telecom is a world leader in manufacturing telecommunications equipment, and is uniquely qualified to address the issues raised in the comments responding to Alcatel's petition. Northern Telecom is the leading global supplier, in 90 countries, of digital telecommunications switching systems, providing products and services to the telephone operating companies, governments, and other institutions worldwide. Northern Telecom has some 60,000 employees, and had revenues in 1991 of \$8.2 billion.

Northern Telecom believes that fixed microwave radio will continue to play an important role in switched broadband networks, even as fiber is more widely deployed, and that radio products compatible with Synchronous Optical Network ("SONET") products must be capable of operating in a seamless fashion with SONET fiber systems. Northern Telecom is investing heavily in research and development to continue introducing advanced technologies that increase spectral efficiency to fulfill the requirements of today's and future communications networks. In particular, Northern Telecom is a major supplier of advanced fixed microwave equipment, and pioneered spectrally-efficient

high capacity microwave equipment. Northern Telecom was the first manufacturer to commercialize 64 Quadrature Amplitude Modulation ("QAM") technology in 1983 in response to the needs of the then nascent competitive long distance industry. There are now over 17,000 radio units deployed utilizing this technology. The 64 QAM technology developed by Northern Telecom allows a spectral efficiency rate of 5 bits/sec/Hz, and provides capacity of two or three DS3's per 20 MHz or 30 MHz radio channel (equivalent to 1344 or 2016 voice channels).

Northern Telecom has continued to increase the efficiency of its microwave equipment, and has introduced 512 QAM technology. These recent advances result in a spectral efficiency of 8 bits/sec/Hz, reflecting a 60% increase in efficiency when compared to the previous generation of highly efficient equipment. Northern Telecom's 512 QAM technology allows the capacity of six DS3's/STS-1's to be carried per 40 MHz radio channel, which is equivalent to 4032 voice channels.

This new technology was introduced as part of Northern Telecom's FiberWorld, which integrates fiber optic and microwave-based SONET transmission and switching equipment.^{2/} The

^{2/} FiberWorld is a Northern Telecom product family that consolidates the economic and performance benefits of fiber transport into a total integrated strategy, delivering an end-to-end portfolio of products rigorously designed to open, public standards such as SONET and TR-403. Through the synergy of fiber optic access and transport technology with broadband switching, FiberWorld unleashes the power of the fiber network with full multivendor interworking and compatibility. In addition, through its 512 QAM technology, Northern Telecom has integrated broadband radio products into the FiberWorld family, thereby making available a comprehensive switched broadband network.

continued availability of spectrum for high-capacity microwave links is a necessary element of a robust telecommunications infrastructure that can support the Information Age. Therefore, the Commission should not adopt a migration plan that jeopardizes the high-density microwave routes presently operating in the 4 GHz, 6 GHz and 11 GHz bands.

Northern Telecom supports the Commission's proposals to allocate spectrum in the 2 GHz band for new and innovative services such as PCS.^{3/} Thus, Northern Telecom agrees with the principle underlying the Alcatel petition, that the Commission should develop an orderly plan for the migration of fixed microwave licensees to other bands, and that a "general waiver" standing alone would not provide for such a transition. Northern Telecom believes, however, that the plan presented by Alcatel is deficient in at least one significant respect -- the Commission must assign frequencies for narrow bandwidth channels in a manner that precludes those systems from hindering the highly efficient wide bandwidth channels that common carriers are currently operating in the 4 GHz, 6 GHz and 11 GHz bands. Moreover, the Commission must also ensure that adequate spectrum remains available for expansion of these highly efficient wide bandwidth channels.

^{3/} E.g., Northern Telecom Response to Notice of Inquiry Relating to Establishment of Personal Communication Services, FCC Doc. 90-314 (Oct. 1, 1990); Reply Comments, FCC Doc. 90-314 (Jan. 15, 1991); Northern Telecom Response to Notice of Proposed Rulemaking on Redevelopment of Spectrum, FCC Docket No. 92-9 (June 5, 1992).

The Alcatel proposal, in contrast, would allow the narrow bandwidth users in the 2 GHz band to migrate to frequencies used for the wide bandwidth channels, thereby jeopardizing the availability of these highly efficient services. In essence, if allowed to operate in the same frequencies, these less efficient low capacity paths would block the usage of the spectrum by more efficient high capacity systems. Northern Telecom's concerns are reflected in the comments received in response to the petition for rulemaking. MCI indicated that ongoing expansion of its fixed point-to-point microwave networks is an integral part of its overall network development, through both the addition of frequencies to the existing high-capacity links and the construction of new paths.^{4/} MCI observed that for routes where traffic loading does not justify the tremendous capacity of fiber optics, high capacity microwave links can and will continue to be economically deployed; only where fiber optic technology is more economical will the competitive forces characterizing the long distance marketplace dictate its use. Thus, wide bandwidth channels are an important complement to the deployment of fiber optics, and the continuing need for wide bandwidth spectrum must be recognized by the Commission.

Similarly, CTI explained that migration of the 2 GHz fixed service users to the 4 GHz and 6 GHz bands would not promote the public interest since it would require the subchannelization of the wide bandwidth channels, and would

^{4/} MCI Comments at pp. 4-6.

greatly limit the ability of common carriers to expand their capacity to meet immediate customer needs. At the same time, such a mixing of narrow bandwidth and wide bandwidth users would significantly increase the risk that a degraded level of interference could be caused to already existing licensed microwave stations.^{5/} Likewise, Pacific Telesis stated that it "opposes any attempt to reduce the multi-DS3 capacity and subdivide each 30 MHz channel into three 10 MHz channels for 1xDS3 radios" in the 6 GHz and 11 GHz bands.^{6/}

Northern Telecom believes that the Commission can craft an orderly migration of the 2 GHz licensees so as to free up spectrum for new services without at the same time jeopardizing the availability of highly efficient wide bandwidth services in the 4 GHz, 6 GHz and 11 GHz bands. As an initial proposition, Northern Telecom suggests that any relocating 2 GHz licensees should relocate to spectrum available in the upper-6 GHz (6.6-6.8 GHz), 10 GHz (10.5-10.6 GHz) and 18 GHz (17.7-19.7 GHz) bands, which already are channelized into narrow bandwidths, and thus are better suited for the 2 GHz licensees.^{7/} Northern Telecom further suggests that if additional spectrum is needed to accommodate the relocating 2 GHz licensees, then the Commission could consider developing narrow channelization in the 7 GHz band (6.875-7.125 GHz), the 12 GHz band (11.7-12.2 GHz) and the 13 GHz

^{5/} CTI Comments at p. 2.

^{6/} Pacific Telesis Comments at p. 3.

^{7/} See also, Comments of NSMA at p. 2.

(12.7-13.2 GHz) band, as well as the channel guard-bands proposed by NSMA.^{8/}

In addition, the Commission can promote the use of efficiency-enhancing technologies by the narrow bandwidth users in order to ensure the availability of adequate capacity. These technologies include Adaptive Transmit Power Control ("ATPC"), high density modulations, and cross-polarization interference cancellation to maximize spectrum utilization. Moreover, with respect to the upper-6 GHz band, Northern Telecom believes that fixed microwave capacity can be greatly increased beyond the Commission's estimates so as to be able to accommodate the relocating as well as new licensees through the use of tighter antenna specifications and use of a two frequency plan. These steps will increase capacity by some 100-200 percent beyond the calculations utilized by the Commission in evaluating available alternatives for the 2 GHz licensees.^{9/}

Northern Telecom believes that an additional benefit to confining the relocating 2 GHz licensees to particular bands for narrow bandwidth channels, rather than allowing them to operate throughout the common carrier bands, is that such a "concentration" of users will allow manufacturers to enjoy scale economies because of the narrower operating range of these narrowband systems. Equipment will need to be designed or modified only for a well defined set of specific frequencies for

^{8/} NSMA Comments at p. 3.

^{9/} OET Report No. TS 92-1.

all of the narrowband microwave users, rather than having to adapt transmitters and receivers for use over a wide variety of bands. These scale economies in turn will translate into lower costs for the relocating licensees.

CONCLUSION

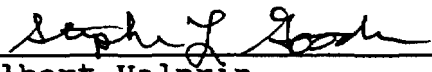
Northern Telecom supports the Commission's efforts to make spectrum available for new services, and believes that as part of that effort the Commission can and should develop a plan for an orderly migration of fixed microwave users from the 2 GHz band. Northern Telecom stands ready to assist the Commission in these important undertakings. In devising such a migration plan, however, the Commission should not allow narrow bandwidth systems to operate in the same frequencies as wide bandwidth systems. Mixing the two types of systems in the same bands will degrade the service and block the expansion capabilities of the highly efficient wide bandwidth systems, thereby wasting valuable spectrum.

The existing highly efficient wide bandwidth systems in the 4 GHz, 6 GHz and 11 GHz bands have well served the public interest by, inter alia, making possible long-distance competition. Moreover, these highly efficient radio systems will continue to serve as an important part of the switched broadband telecommunications infrastructure in the future. Thus, the Commission should not adopt a plan for the migration of narrowband 2 GHz systems that could impair these wide bandwidth

systems as suggested by Alcatel, but instead should maintain distinct allocations for narrow bandwidth and wide bandwidth systems.

Respectfully submitted,

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August 5, 1992

CERTIFICATE OF SERVICE

I, Laura E. Magner, do hereby certify that a copy of the foregoing Reply Comments of Northern Telecom Inc. was mailed, postage prepaid, this 5th day of August, 1992, to the following:

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